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EXAMINER

HANLEY, JOHN C

ART UNIT	PAPER NUMBER
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2856

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.		Applicant(s)	
	10/789,037		ACAR ET AL.	
	Examiner		Art Unit	
	John C. Hanley		2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/29/05 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 - Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 - Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some * c) ☐ None of:
 - 1. ☐ Certified copies of the priority documents have been received.
 - 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Drawings***

1. The drawings are objected to because Figure 2 shows two elements named "m1"; Fig. 7b mentions f22 not described in the description; and Fig. 8B has two occurrences of f22/f11 not described in the description. The first, second and third flexures are not all numbered. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 3, 5, 6, 12, 14, 15, 18-20, 26 and 28 are objected to because of the following informalities:

3. In claim 3, the drive-mode “oscillator drives the three interconnected masses” is objectionable since the drive-mode oscillator is defined as the three interconnected masses *driven into* oscillation by electrodes. Similarly, the sense mode-oscillator does not sense. It oscillates, and the movement of the oscillator is sensed by a sensor.

4. In claim 5, “the third mass, which comprises a vibration absorber” is objectionable because the third mass is the vibration absorber. It doesn’t include a vibration absorber as an element.

5. Regarding claim 6, the substrate is repeated in the claim in such a way that it implies more than one substrate.

6. Regarding claim 12, “the third mass absorbs vibrations of the sense mode oscillator” is objectionable because the third mass is a component of the sense-mode oscillator, and not a separate element.

7. Regarding claim 14, the first two instances of “comprise” should be “comprises”, and “the” should be inserted before “three” in line 2 to refer to the previously recited three masses. “Sensing motion of at least one of the three ... masses” is objectionable because it implies that sensing more than one is covered, but not disclosed. Further, “m3 is the magnitude...” is duplicated.

8. Regarding claim 15, “second motion of the sense-mode oscillator” is objectionable because it infers a first motion of the same, which is not recited.

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9. In claim 18, the same drive motions are repeated several times in different language as different steps.

10. In claim 19, the sentence structure is not grammatically correct. Oscillating the second mass in the second direction does not generate a rotation-induced force. Drive motion and rotation induce an oscillation in the second direction. The third mass does not comprise a vibration absorber. It is the vibration absorber.

11. There is no antecedent basis for "the three interconnected masses" in claim 20. Further, the implication that the first mass moves the second mass in the sense direction via a force transferred through the second flexure is objectionable.

12. In claim 26, "sensing motion of at least one of the three ... masses" is objectionable because it implies that sensing more than one is covered, but not disclosed. "Driving three interconnected masses in a drive direction" is unnecessarily repeated, and/or improperly associated with mechanical amplification in the sense direction. "Mechanically amplifying sense direction ... amplitudes in one of the three ... masses acting as the vibration absorber in the sense-mode oscillator" is objectionable because it implies a mass other than the third mass can do this.

13. Regarding claim 28, m3 is the magnitude..." is duplicated, and double commas appear in line 10.

14. Appropriate correction is required.

Claim Rejections - 35 USC § 112

15. Claims 3, 4-7, 10-13, 21 and 24-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification.
16. In claim 3, only one mass is sensed in the sense-mode oscillator, according to the specification.
17. In claim 4, the specification does not describe the first mass as a passive mass. Nor does it teach a sense-mode oscillator that includes drive means for driving a mass in a sense direction, or a drive-mode oscillator having a sense means.
18. In claim 6, the specification does not teach a sense-mode oscillator that includes drive means for driving a mass in a sense direction, or a drive-mode oscillator having a sense means.
19. In claim 7, the first and third flexures are not disclosed having a resiliency in the same (i.e., first) direction.
20. In claim 10, the specification does not teach a sense-mode oscillator that includes drive means for driving a mass in a sense direction, or a drive-mode oscillator having a sense means.
21. In claim 12, the specification does not teach a sense-mode oscillator that includes drive means for driving a mass in a sense direction, or a drive-mode oscillator having a sense means.

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22. In claim 21, the third mass is not disclosed as being coupled to the second mass by two coupled folded springs.

23. In claim 24, the specification does not teach a sense-mode oscillator that includes drive means for driving a mass in a sense direction, or a drive-mode oscillator having a sense means.

24. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

25. Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

26. Regarding claims 1 and 15, “dynamically mechanically decoupled” and “decoupling the first motion of the drive-mode oscillator from the second mode of the sense-mode oscillator”, respectively, are structurally unclear. It is difficult to interpret the structural meets and bounds of the limitation “dynamically mechanically decoupled” is, when in claim 2, for example, it is claimed “the drive-mode oscillator and sense-mode oscillator ... *dynamically amplify* movement in a drive direction and in a sense direction”. Further, if the “drive-mode oscillator” was dynamically decoupled from the sense-mode oscillator, the device would not work, as stated in paragraph 26 of the prior office action, repeated here:

Applicant’s approach of mixing separate structural elements with overlapping functional elements, and vice versa, makes it cumbersome to offer suggested language fixes. The disclosure teaches that the drive-mode oscillator is composed of at least ALL of the sense-mode oscillator components. Thus the sense-mode oscillator, as an integral

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component of the drive-mode oscillator, cannot, by definition, be decoupled in a broad sense from the drive-mode oscillator--because it structurally IS the drive-mode oscillator, too. Moreover, since the frequency of the sense-mode oscillations due to Coriolis force is directly related to the drive frequency, they cannot be said to be decoupled, either mechanically or dynamically. In fact, the very purpose of the system is to couple drive-mode oscillations into sense-mode oscillations via a Coriolis mechanical force.

27. As previously argued, the intermediate mass is component part of the BOTH drive-mode oscillator AND the sense-mode oscillator. The movement of the intermediate mass in the sense direction is DIRECTLY related to its motion in the drive-direction. If the drive motion of the intermediate mass did not exist, the desired motion in the sense oscillator direction would not exist. Indeed, the Coriolis force that drives the sense oscillator has, in its equation, the component dx/dt , the motion in the drive direction. Further, the oscillator masses m_2 and m_3 are dynamically amplified in the drive direction, with m_3 being part of the drive oscillator and the sense oscillator, and no apparent means to decouple its sense direction from its drive direction. Thus, it is unclear how applicant can allege that the motion of the drive-oscillator is decoupled from the motion of the sense oscillator with the structure claimed, so the "decoupled" language is structurally vague and indefinite. Further, since the oscillators are inherently coupled to some degree, and applicant has recognized that coupled oscillations have been suppressed in the prior art (page 2, lines 13-15), applicant has not clearly set forth the bounds of the degree of coupling or decoupling for which something can be defined as "decoupled" according to the claims.

28. Further regarding claim 1, the term "employ" is structurally vague and indefinite. The claim recites that both the drive-mode oscillator *and* the sense-mode oscillator "employ" the three interconnected masses. What is the *structurally* limitation meant by

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“employ” (especially regarding the first mass with regard to the sense-oscillator, when applicant specifically states that the sense oscillator is made up of the second and third masses {page 2, last 2 lines})?

29. Claim 1 further positively recites three masses, a drive-mode oscillator, and a sense-mode oscillator as separate structural elements, yet the disclosure teaches that three masses form a drive-mode oscillator and two of the same three masses form the sense-mode oscillator. Therefore, positively listing these as separate elements is structurally vague and indefinite. Further, “operated in a nonresonant mode” is functional or operational language that is not structurally supported, and is therefore structurally vague and indefinite. Further, it is unclear as to what the resonance issue structurally refers. For example, applicant states the oscillators are operated in a non-resonant mode. However, on page 6 of the application, it is stated that input force F_d has a driving frequency that is matched with the resonant frequency of an isolated passive mass-spring system, and that a Coriolis force is applied to the second mass, whose frequency is matched with a resonant frequency of the isolated passive mass-spring system [see also claims 11 (moves to cancel, which is resonance, according to the description), 13, and 27, for example, which indicate resonances). Since these masses are elements of each oscillator, “operated in a non-resonant mode” is inconsistent with the spec, and structurally unclear as to the operation of the “oscillators” vs. operation of the individual masses that the oscillators are comprised.

30. Regarding claim 2, it is unclear what movement is dynamically amplified. “Large oscillation amplitudes” is vague and indefinite as to what is large. It is unclear how the

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drive-mode oscillator dynamically amplifies movement in the sense direction and the sense-mode oscillator amplifies in the drive direction.

31. Regarding claims 11 and 13, it is structurally unclear how the gyroscope can be resonant and nonresonant at the same time.

32. Regarding claims 12 and 13, the claim omits the essential element of what is being mechanically amplified.

33. Regarding claim 16, it is unclear what motion is dynamically amplified. "Large oscillation amplitudes" is vague and indefinite as to what is large. It is unclear how the drive-mode oscillator dynamically amplifies motion in the sense direction and the sense-mode oscillator amplifies in the drive direction.

34. Regarding claim 25, it is unclear what is being dynamically amplified and how the method can cause the gyroscope to be resonant and nonresonant at the same time.

35. Regarding claim 26, it is unclear what is amplified.

36. Regarding claim 27, it is unclear how the gyroscope can be resonant and nonresonant at the same time, and it is unclear what is amplified.

Claim Rejections - 35 USC § 102

37. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

38. Claims 1, 15, 20 rejected under 35 U.S.C. 102(e) as being anticipated by Willig et al (US 6691571).

39. Willig et al show a drive-mode oscillator 102, a sense-mode oscillator 140, wherein the drive-mode oscillator and sense-mode oscillators employ three interconnected masses 102, 100 and 140, where element 140 is decoupled in the sensing direction from the driving direction. The sense-mode oscillator 140 is driven by a Coriolis force imposed upon Coriolis element 100 derived from the drive-mode oscillator 102. The oscillator 140 is decoupled from oscillator 102 by connections 142. The drive-mode oscillator 102 has a drive means 104/105, and the sense mode oscillator includes sense means 101 to sense its motion. A substrate supports first mass 102 via anchors 106 and flexure 107 for movement only in the drive direction. The second mass 100 is coupled to the first mass 102 via flexures 107, to transfer force in the drive direction and allow movement in the sense direction. Third mass 140 is moved in the sense direction only by coupling the sense motion of the second mass 100 by means of a third flexure 142. Although the device "may be" operated in a "resonant

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mode", it is clear from the teaching of the patent that it may not be (column 2, lines 41-44). Thus, it is structurally capable of being operated in a "nonresonant" mode.

40. Applicant's remarks have been read and considered but are unpersuasive because they do not eliminate the objections and rejections listed above. Further, applicants accusation that the examiner attempts to confuse the sense and drive mode oscillations is not well received, especially when the examiner, at a very early stage in the prosecution of this application, recommended that applicant not blend the mass structures and oscillator structures in the manner in which they were recited. As to the nature of the Coriolis force being generated by the second mass, the examiner still contends the Coriolis force acts upon the second mass to cause its motion in the sense direction (as stated in the originally filed disclosure on page 6, forth paragraph), said force being induced by the driving motion and the rotary motion, and that it's the *momentum* of the second mass that drives the third mass. However, the examiner believes one skilled in the art would interpret applicant's claims and description properly in order to make and use the invention, so is dropping this argument as an objection. As to the decoupling issue, decoupling cannot be entirely eliminated, and while applicant has shown structure for reducing coupling, he has not defined the degree of decoupling that would render the breath of the term in the claims as structurally definite or interpretable against other structure. Further, applicant's approach of reading disclosure into the claims does not make the claims more definite. Applicant argues that the invention is better defined in direct terms of the masses and their movements. The

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examiner couldn't agree more, but doesn't agree that this has been accomplished, especially in the independent claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Hanley whose telephone number is 571-272-2195. The examiner can normally be reached on M-F 9AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCH



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